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## Spatial interactions between grey wolves and Eurasian lynx in Białowieża Primeval Forest, Poland

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**Abstract** Various species of large predators are reported to influence each other through interference or exploitation competition that may affect demography and survival of the subordinate species. We analyzed spatial relationships between grey wolf (*Canis lupus*) and Eurasian lynx (*Lynx lynx*) in Białowieża Primeval Forest (BPF, eastern Poland) to determine how they partitioned the space. The wolves ( $n = 8$ ) and lynx ( $n = 14$ ) were radio-tracked in 1991–1999. Three wolves and seven lynx were radio-tracked simultaneously in 1994–1996. Territories of wolf packs and home ranges of lynx overlapped considerably (76% of wolf territories and 50% of lynx home ranges, on average). In three cases, their core areas were also overlapping. Wolf-lynx dyads with overlapping home ranges were simultaneously located at distances from 0 to 28 km from each other. We found neither avoidance nor attraction between wolves and lynx occupying the same areas. We concluded that in BPF, the two large predators coexist due to specialization on different preferred prey and heterogeneous habitat.

**Keywords** *Canis lupus* · Coexistence · Exploitation competition · Interference competition · *Lynx lynx* · Spatial overlap

### Introduction

What enables various carnivorous mammals to coexist and how they interact with each other when occurring

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sympatrically has been a subject of numerous studies. Rosenzweig (1966) suggested that coexistence results from size differences between predator species. Felids and canids seem to be particularly predisposed to “peaceful coexistence” (Major and Sherburne 1987) through separation of their ecological niches, which likely resulted from evolution of their different social systems (Kleiman and Eisenberg 1973).

On the other hand, competitive exclusion was recently suggested between tigers (*Panthera tigris*) and wolves (*Canis lupus*) despite extreme size differences (Miquelle et al. 2005). Cases of interspecific killing are common among predators, including felids and canids (review in Palomares and Caro 1999). In some instances intraguild predation may have serious consequences on demography and survival of the inferior species, as it has been suggested for cheetahs (*Acinonyx jubatus*) (Laurenson 1995) and African wild dogs (*Lycaon pictus*) (Creel and Creel 1996; Carbone et al. 1997).

Grey wolves and Eurasian lynx (*Lynx lynx*) are sympatric across most of their vast geographical ranges, which stretch from Eastern Europe to the Far East of Asia (Bibikov 1985; Nowell and Jackson 1996). The spatial interactions between these species, however, have not yet been studied. Anecdotal information on their interspecific relationships (based on harvest data and incidental observations) are available from the Russian part of their ranges and from Fennoscandia. According to those reports, coexistence of the two large carnivores is often characterized by negative influences of wolf on lynx (Pulliainen 1965; Myrberget 1970; Matyushkin 1985; Malafeev et al. 1986; Matyushkin and Vaisfeld 2003). Dynamics of wolf and lynx population numbers reported there suggest that lynx may reach higher numbers only when wolves are rare. Cases of wolves killing lynx have also been reported (see Matyushkin and Vaisfeld 2003 for review). On the other hand, it has also been suggested that the relationships between the two species may differ with ecological circumstances (Matyushkin 1985). Indeed, in some areas, populations of both predators existed in large numbers without